

South Korea's Chemical Sector: The Miracle on the Han River Moves on

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INTRODUCTION

A silent, shining monorail whisks recently arrived passengers from the spotless arrivals terminal at Incheon airport to the equally unblemished passport-processing center and customs office. Travellers may then choose between taking the new high-speed rail link to the city center or boarding one of the city's sleek fleet of limousine buses. Whether by road or by rail, visitors to Seoul will immediately be struck by two features: the modernity and cleanliness of the infrastructure, and the all-pervading presence of oversized LCD screens on buildings, attached to vehicles and in the hands of other passengers. One is left in little doubt that this is a country that lives by technology and one which is enjoying the effects of a prolonged economic boom. In 1961 the average yearly income per person was just \$82, yet today the country boasts the world's 12th largest economy and GDP per capita stands at \$31,900.

This meteoric growth was made possible in the beginning thanks to state sponsored nurturing of key industries. The Sovi-

et-esque Heavy and Chemical Industrialization Five-year Plan, initiated by General Park Chung-Hee in 1973, sought to direct as many resources as possible towards boosting international competitiveness in electronics, machinery and, of course, chemicals. The result of this first organized industrial drive was that per capita income increased by more than five times between 1972 and 1979.

The initial focus of the program was to establish Korea as a major petrochemicals producer, an ambition that necessitated the opening of two major petrochemical complexes at Ulsan and Yeosu, which catapulted the nascent industry onto the world stage. However, it was not until the 1990s that production really took off and South Korea established itself as a net exporter, eventually becoming the world's fourth largest producer of ethylene in 1995. Today the country has slipped into fifth place, having been overtaken by Saudi Arabia, but petrochemicals still constitute an important part of the export economy, generating a \$22.4 billion trade surplus in 2012.

In parallel, the Koreans have also built up a considerable level of expertise and substantial production volumes in more basic





Jason-WooSung Shin, senior vice president and managing director, BASF Korea

aspects of the specialty chemical field. Today we are seeing a clear effort to promote more research-intensive, high-risk areas such as biotechnology and pharmaceuticals, nanotechnology and, perhaps most interestingly, electronic chemicals.

All of the 25 largest global chemical companies now operate at least one manufacturing base in the country, whilst local giants such as LG Chemicals and SK Chemicals enjoy a dominant position in the market.

A FORK IN THE ROAD FOR PETROCHEMICAL PRODUCERS

Despite having extremely limited reserves of oil and gas, South Korea has been able to remain a cost-effective producer of upstream petrochemical products. This has largely been thanks to an almost symbiotic relationship with neighboring China, which consumes nearly one quarter of total yearly petrochemical output. Recently, as the Chinese approach self-sufficiency in petrochemical production, the tide is turning for Korea's producers.

It is no secret that 2012 and 2013 were difficult years for the sector on a global level. Although total production volumes continued to grow over these years in South Korea, total turnover only increased by 2% to 3%.

Whilst investment forecasts for the sector are still relatively strong, with local energy providers SK Gas planning to

spend up to \$890 million on a new propylene plant by 2016, long-term prospects are less positive. It is expected that output will continue to increase, but there will be no significant upturn in prices which plummeted during 2012, suggesting that overall profitability will remain at low levels.

Given that the petrochemical sector now seems locked into an inevitable decline, chemical producers must adapt their strategy: "From now on the main driving force for the industry must be the evolution towards producing high value specialty chemicals, particularly for electronic and automotive applications," counsels Jong-Woo Park, CEO of specialist chemical industry consulting firm CMRI.

Between 1960 and 1990, the Specialty sector grew at a fairly steady 7.5%, but between 2000 and 2010 this figure increased to 12.5% thanks to a sharp increase in domestic manufacture of paints, dyes and pigments. More recently, local heavyweights LG Chemical have successfully diversified away from their petrochemical roots to become very prominent in the manufacture of chemicals for batteries, whilst OCI, a green energy and chemical producer, has been nurturing their polysilicones business as a means of guaranteeing future profitability.

This trend is bringing European and American specialty producers into direct competition with domestic manufacturers. "Korea has a large and well-qualified workforce as well as proven expertise in operational excellence, so local chemical companies should capitalize on these ad-

vantages in order to remain competitive," argues Jason-WooSung Shin, senior vice president and managing director for BASF Korea.

PITFALLS AND PERKS FOR FOREIGN COMPANIES IN KOREA

From the perspective of foreign multinationals, Korea has long been viewed as a tricky market to penetrate. Before the 1997-1998 Asian financial crisis, protectionist policies made foreign direct investment difficult if not impossible. The crisis brought opportunities for international companies to enter through joint ventures as local producers looked for foreign capital to stay afloat. With a foot in the door, they were then able to develop their business further, incorporating new units and manufacturing capabilities of their own. However, it has been far from an easy ride.

Multinationals operating in Korea have all made reference to the same litany of complaints: high taxes, overly complex regulations, a tendency to favor domestic players over foreigners, and difficulties sourcing skilled professionals. Whilst recent governments have worked to level the playing field for foreign companies and bring about more consistent regulations, stories still abound of investors being promised certain tax incentives, only to have them challenged at the end of the year.



Ulsan Plant. Photo courtesy of Evonik Korea Ltd.

Although Korea may have the highest college graduation rate in the OECD, foreign companies find it difficult to capitalize on this talent pool as the chaebol – South Korea’s gargantuan conglomerates – absorb vast quantities of new graduates, playing on the domestic strength of their brands and the promise of extremely high wages. In fact, elevated salaries are becoming increasingly problematic for the Korean economy: “The average wage in Korea is already quite high but it continues to grow at a rate of 5% or more every year. This is possible in a country that is still developing and undergoing rapid societal transformation, but in an already developed country like Korea this is not sustainable,” explains Toni Schreiberweiss, president of Evonik Korea.

However, despite all the above setbacks, many foreign chemical companies continue to invest in Korea. Foreign direct investment (FDI) inflows to the country remain amongst the lowest in the OECD, but a recent report from the organization shows that Korea was the biggest reformer of its policies towards FDI between 1997 and 2010. Between 2003 and 2013, the chemical sector received approximately \$7.5 billion in FDI, making it the Korean economy’s second highest recipient of foreign investment. Even more encouraging are figures from the Ministry of Trade, Industry & Energy (MOTIE), which show that investment pledges rose by 18.9% in 2012, with chemical companies making up a significant proportion of this new activity.

The reasons for this are not obvious at first glance: in spite of President Park

Guen-hye’s stated ambition to lessen South Korea’s reliance on exports and reduce the country’s vulnerability to fluctuations in foreign markets, the fact remains that Korea does not constitute a large internal market. Moreover, given the substantially lower labor costs and the greater availability of cheap raw materials in South East Asian nations, these would seem like more logical destinations for new investments.

The attraction of Korea lies elsewhere: “It is important to maintain a permanent presence in South Korea, partly to cater to the local demand, but also because it is a good base for innovation and a crucial reference point to build relationships with increasingly globalized Korean companies,” says Denis Tual, president and representative director of Arkema Korea.

Although the Korean conglomerates may be competitors when it comes to the



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Toni Schreiberweiss, president of Evonik Korea Ltd.

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labor market (and also for the production of certain chemicals), their size makes them important clients. Given the high speed of technological change in Korea's principal industries of consumer electronics and automobile production, the need for a close customer-supplier relationship is crucial. In order to fit in with the hectic pace of Korean product development, many European chemical companies grant their Korean offices a greater degree of autonomy than is normally the case. Manufacturing facilities must also be built with flexibility in mind: "We always look at technologies and processes that are easier to adapt, and machines that will be able to move on as the end products become more advanced," explains André Nothomb, Special Chemicals executive vice president for Solvay Korea.

Both Dow and BASF have relocated their regional HQ for their respective electronics businesses to Seoul and both operate substantial research facilities in this area. Belgian specialty chemical producer Solvay has recently opened a state-of-the-art research center in collaboration with Seoul's Ewha Women's University, thus allying themselves with a constant source of newly graduated scientists. "There is great potential for synergies to be developed between our commercial pursuits and the university's teaching faculty and Solvay will be able to offer internships across several different areas to students," claims Nothomb.

Additionally, Korea boasts a high number of start-ups carrying out pioneering work in fast-growing fields which have caught the attention of foreign venture capital funds run by European and American chemical firms.

K – REACH – REGULATIONS TIGHTEN UP

On April 31, 2013, Korea became the first country in Asia to pass European Union style regulations on chemical reporting. The Act on Registration and Evaluation of Chemicals of Korea (K-REACH) has



Dow Seoul Technology Center - Dow EM global R&D center in Korea. Photo courtesy of Dow Chemical Korea

been in development since early 2011 and is scheduled to come into force on January 1, 2015. This is in keeping with a trend that has developed in recent years for Korea to adopt European industrial regulations and then modify them to fit their purposes. In their current format, the requirements are considerably more stringent than those in Europe, and certain elements seem highly impractical at first glance. "Under the proposed regulations it is necessary to report the exact quantities of all existing chemical substances of the imported materials in quantities of over 1 mt/y. This may seem reasonable on the surface, but the issue of intellectual property arises when you consider that this would require companies to comprehensively list the ingredients of their patented compounds," warns Toni Schreiber of Evonik.

Ongoing discussions between industry representatives and regulators regarding the fine print of the legislation, mean that there is still some time for these issues to be ironed out before the law is implemented. Even so, the additional reporting requirements will generate a substantial cost increase for both domestic producers and importers. "It is possible that certain companies will see their profitability drop by over 30% if they are forced to comply with these laws," suggests Jong-Woo Park, CEO of CMRI.

After a series of serious environmental accidents, the Korean government is

also keen to promote tougher environmental laws. Today companies can attain a green accreditation at their plants by "meeting a range of criteria across diverse metrics such as environmental management systems, resource and energy conservation, pollution reduction, safety improvement and community engagement," said Jason-WooSung Shin of BASF Korea, whose facilities at Yeosu and Ulsan were among the first to receive this recognition.

However, industry experts still complain that there is a real need for more investment in developing environmental chemical technology and the production of more eco-friendly materials in order to bring the sector in line with other advanced chemical producers such as the USA and Germany. To this end, the government has embarked on an ambitious plan to develop ten new green composite materials with the goal of claiming 30% of world market share by 2018.

This is a welcome directive, for although Korea is consistently ranked among the top five most innovative nations in terms of patents granted by the US Patent and Trademark Office, relatively few of these are filed by chemical companies. Local businesses must now look to increase their spending on R&D or seek out more opportunities to collaborate with their international peers if they wish to reap the full benefits of Korean technology's continued growth.